

CLAIMS

1. A method of producing a tire cord comprising a twisted cord and an adhesive layer for rubber coated on the surface of the twisted cord, which comprises a step of coating the twisted cord by spraying
5 an adhesive material.
2. A method of producing a tire cord according to claim 1, which comprises a step of uniformizing the coating of the adhesive material on the twisted cord through an interlacer or a blow nozzle after the spraying.
- 10 3. A method of producing a tire cord according to claim 1 or 2, wherein a predetermined amount of the adhesive material is fed by a pump in the spraying.
4. A method of producing a tire cord according to any one of claims 1 to 3, wherein the adhesive material has a viscosity of
15 50-3000 mPa·s.
5. A method of producing a tire cord according to any one of claims 1 to 4, wherein the adhesive material is an adhesive composition containing (A) a conjugated diene polymer having a weight average molecular weight of 500-100,000 and (B) a basic
20 compound having an electron pair donor property.
6. A method of producing a tire cord according to claim 5, wherein the adhesive composition contains the basic compound having the electron pair donor property (B) in an amount of 0.2-50 parts by mass based on 100 parts by mass of the conjugated diene polymer (A).
- 25 7. A method of producing a tire cord according to claim 5 or 6, wherein a reaction heat curve of a mixture consisting of 100 parts by mass of an adhesive composition and 3 parts by mass of sulfur such as cyclic sulfur (S) (measured by a differential scanning calorimeter at a temperature rising rate of 5°C/min) indicates a reaction heat peak
30 accompanied with the vulcanization reaction at a temperature zone of not higher than 190°C, which is not observed in a reaction heat curve of a mixture consisting of 100 parts by mass of the above conjugated diene polymer (A) and 3 parts by mass of sulfur.

8. A method of producing a tire cord according to any one of claims 1 to 7, wherein in a composite formed by adhering such an adhesive layer for rubber with the rubber mixture containing sulfur, when a count quantity of sulfur atoms in a section perpendicular to the adhered face through a fluorescent X-ray is measured by an X-ray analysis through an electron microscope, the sulfur count quantity in the adhesive layer for rubber becomes larger than an average distribution of the sulfur count quantity in the adhered rubber.

9. A method of producing a tire cord according to any one of claims 5 to 8, wherein the adhesive composition further contains (C) a compound having three or more functional groups capable of crosslinking through a ultraviolet ray or radiation irradiation in one molecule and/or (D) a compound having one or two functional groups capable of conducting radical polymerization through a ultraviolet ray or radiation irradiation.

10. A method of producing a tire cord according to any one of claims 5 to 9, wherein a terminal group of the conjugated diene polymer (A) is vinyl group, acryloyl group, methacryloyl group, acryloyloxy group, methacryloyloxy group or allyl group.

11. A method of producing a tire cord according to any one of claims 5 to 10, wherein a terminal group of the conjugated diene polymer (A) is acryloyloxy group or methacryloyloxy group.

12. A method of producing a tire cord according to any one of claims 5 to 11, wherein the basic compound having an electron pair donor property (B) is a nitrogen-containing compound having unpaired electrons or a compound produced by thermally decomposing the compound having a structure of unpaired electron.

13. A method of producing a tire cord according to claim 12, wherein the nitrogen-containing compound having unpaired electrons is an amine compound or a polymerizable monomer containing an aliphatic amine residue or a heterocyclic amine residue and having carbon-carbon double bond.

14. A method of producing a tire cord according to claim 13,

wherein the amine compound is an aliphatic amine, an aromatic amine, an aldehyde amine, a guanidine, a thiourea or a heterocyclic amine.

15 15. A method of producing a tire cord according to claim 14, wherein the aliphatic amine is dibutylamine, ethylene diamine or polyethylene polyamine, and the aromatic amine is aniline, m-phenylene diamine or 2,4-toluylene diamine, and the aldehyde amine is n-butylaldehyde aniline, and the guanidine is dipheyl guanidiene or diorthotolyl guanidine, and the thiourea is thiocarbanilide, diethyl thiourea or tetramethyl thiourea, and the heterocyclic amine is
10 pyridine or 2-methyl imidazole.

16. A method of producing a tire cord according to claim 13, wherein the polymerizable monomer is at least one compound selected from the group consisting of 2-vinylpyridine, 4-vinylpyridine, m-(N,N-dimethylamino)styrene, p-(N,N-dimethylamino)styrene,
15 acrylamide, metahcrylamide, N-methyl acrylamide, N-isopropyl acrylamide, N-n-butyl acrylamide, N-n-octyl acrylamide, N,N-dimethyl acrylamide, 1-vinyl imidazole, allylamine, 2,5-distyryl pyridine, 2-dimethylaminoethyl methacrylate, N-vinyl-2-pyrilidone, 2-vinyl-2H-indazole, 4-diisopropylamino-1-butene, trans-2-butene-1,4-
20 diamine, 2-vinyl-4,6-diamino-1,3,5-triazine, 4-methyl-5-vinyl thiazole, N-vinylformasmide, N,N-dimethylaminoethyl acrylate, N,N-dimethylaminopropyl acrylamide, acryloyl morpholine and N,N-diethyl acrylamide.

17. A method of producing a tire cord according to any one of
25 claims 12 to 16, wherein the compound having a structure of unpaired electrons is thermally decomposed to form a compound as a vulcanization accelerator.

18. A method of producing a tire cord according to any one of
claims 12 to 16, wherein the compound produced by thermal
30 decomposition of the compound having a structure of unpaired electrons is tetramethylthiuram disulfide.

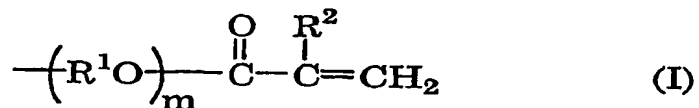
19. A method of producing a tire cord according to any one of
claims 9 to 18, wherein the compound (C) is included in an amount of

30-80 parts by mass based on 100 parts by mass of the conjugated diene polymer (A).

20. A method of producing a tire cord according to any one of claims 9 to 19, wherein the compound (C) is a novolac type phenolic resin modified with acryloyl group and/or methacryloyl group.

21. A method of producing a tire cord according to any one of claims 5 to 20, wherein the adhesive composition further contains at least one additive selected from the group consisting of an epoxy compound, an inorganic filler and a high molecular weight filler.

22. A method of producing a tire cord according to any one of claims 1 to 4, wherein the adhesive material is a ultraviolet ray or radiation curable adhesive composition comprising (A) a conjugated diene polymer having a weight average molecular weight of 500-100,000, (E) a compound having three or more of acryloyloxy group, methacryloyl group or functional group represented by the following formula (I):



(wherein R^1 is an alkylene group having a carbon number of 2-5, and R^2 is a hydrogen atom or an alkyl group having a carbon number of 1-3, and m is an integer of 0-5) in one molecule, and (F) a compound having one or two acryloyloxy groups or methacryloyloxy groups.

23. A method of producing a tire cord according to claim 22, wherein a terminal group of the conjugated diene polymer (A) is vinyl group, acryloyl group, methacryloyl group, acryloyloxy group, methacryloyloxy group or allyl group.

24. A method of producing a tire cord according to claim 22 or 23, wherein a terminal group of the conjugated diene polymer (A) is acryloyloxy group or methacryloyloxy group.

25. A method of producing a tire cord according to any one of claims 22 to 24, wherein 30-80 parts by mass of the compound (E) and

3-60 parts by mass of the compound (F) are included based on
100 parts by mass of the conjugated diene polymer (A).

26. A method of producing a tire cord according to any one of
claims 22 to 25, wherein the ultraviolet ray or radiation curable
5 adhesive composition further contains at least one additive selected
from the group consisting of an epoxy compound, an inorganic filler, a
high molecular weight filler and a basic compound.